

# **FCC Rules Necessary for 8-VSB Distributed Transmission**

**A Policy Presentation for  
Federal Communications Commission Staff  
April 8, 2004**

**S. Merrill Weiss / Merrill Weiss Group**

*Consultants in Electronic Media Technology / Management*

# Dual Presentation

## ✓ Technology Familiarization

- ✓ Overview of Technology at Non-Technical Level
- ✓ Adequate to Support Decision-Making
- ✓ Examples of Applications

## ✓ FCC Policy & Decisions

- ✓ Benefits with respect to Standing FCC Spectrum Policy
- ✓ Decisions Needed to Establish Rules
- ✓ Broadcaster Support

# Agenda

- ✓ Distributed Transmission (DTx) Systems
- ✓ Public Policy Benefits of Distributed Transmission
- ✓ Required Rule Changes
- ✓ Decisions Required in Establishing Rules
- ✓ Broadcaster Support
- ✓ Conclusions

# Distributed Transmission Systems

- ✓ Multiple Transmitters Covering an Area (SFN)

  - ✓ On-Channel Repeaters (successor to "Boosters")

  - ✓ Distributed Transmission

- ✓ Variety of Purposes

  - ✓ Gap Fillers (Filling in Shadows)

  - ✓ Service Maximization (Extending Service)

  - ✓ Creating Signal Hot Spots

  - ✓ Transmitter Diversity

# Public Policy Benefits of Distributed Xmsn

- ✓ Improved Spectrum Efficiency
  - ✓ Like Translators, But Without Another Channel
  - ✓ Stronger Signals, Less Interference
  - ✓ Improved Service to Consumers / Viewers
- ✓ FCC Approaching "Use or Lose" Decision
  - ✓ Broadcasters Need Time to Build Facilities
  - ✓ Distributed Xmsn Is Tool Needed to Enable Many Solutions

# Public Policy Benefits of Distributed Xmsn (2)

- ✓ Some Question Viability of Over-The-Air (OTA) Broadcasting
  - ✓ Loss in Audience Share to Cable / Satellite
  - ✓ Cable & Satellite as Gatekeepers for Broadcast Signals
- ✓ Interest Building In Real OTA as Alternate Delivery Method
  - ✓ "Wireless TV" Concept – John Lawson / APTS – 3/30/04
  - ✓ USDTV Launch – OTA Competitor to Cable ([www.usdtv.com](http://www.usdtv.com))
- ✓ Requires Easy Access by Consumers
  - ✓ Set Top / Indoor Antennas vs Outdoor
  - ✓ Means Higher, More Uniform Signal Levels Needed

# Broadcaster Support

✓ NAB President Eddie Fritts — March 30, 2004

✓ "We need to provide services that exploit all the advantages of over-the-air transmission-and reach the greatest audience possible with a reliable, received signal. For example, ATSC's work on a standard for distributed transmission is commendable. The idea of synchronized multiple transmitters has the potential to help increase the reliability of over-the-air broadcast service."

✓ Speech at ATSC Annual Meeting

## Broadcaster Support (2)

✓ "The undersigned 17 organizations ... jointly urge the Commission to consider formally the authorization of Distributed Transmission techniques for use in digital television operations."

✓ Letter to FCC from 17 Organizations — June 6, 2002

✓ NAB

✓ MSTV

Zenith

✓ APTS

✓ PBS

Harris

✓ Cosmos

✓ Cox

Linx

✓ Tribune

✓ Penn State

Rohde & Schwarz

✓ Pappas

✓ Sinclair

MWG

✓ Peak Media

✓ Cascade

# Required / Proposed Rule Changes

- ✓ **Primary Treatment of Distributed Transmitters**
  - ✓ Inclusion in Part 73 vs Part 74 in most instances
    - ✓ No Additional Spectrum Allotment Required
  - ✓ Protect Distributed Xmtr Service Area Same as Main Service
  - ✓ When Distributed Xmtrs Provide Part of Main Service
    - ✓ Filling Gaps in Coverage, Creating Hot Spots
    - ✓ Maximizing Service Area and Population
- ✓ **Permit DTV Coverage Area Extensions**
  - ✓ More Effective Service Maximization
  - ✓ Proposal for 50% Extension In Each Direction
  - ✓ Distributed Xmtrs Located Within Reference Contours
  - ✓ Population Increase Limited Outside Licensee's DMA

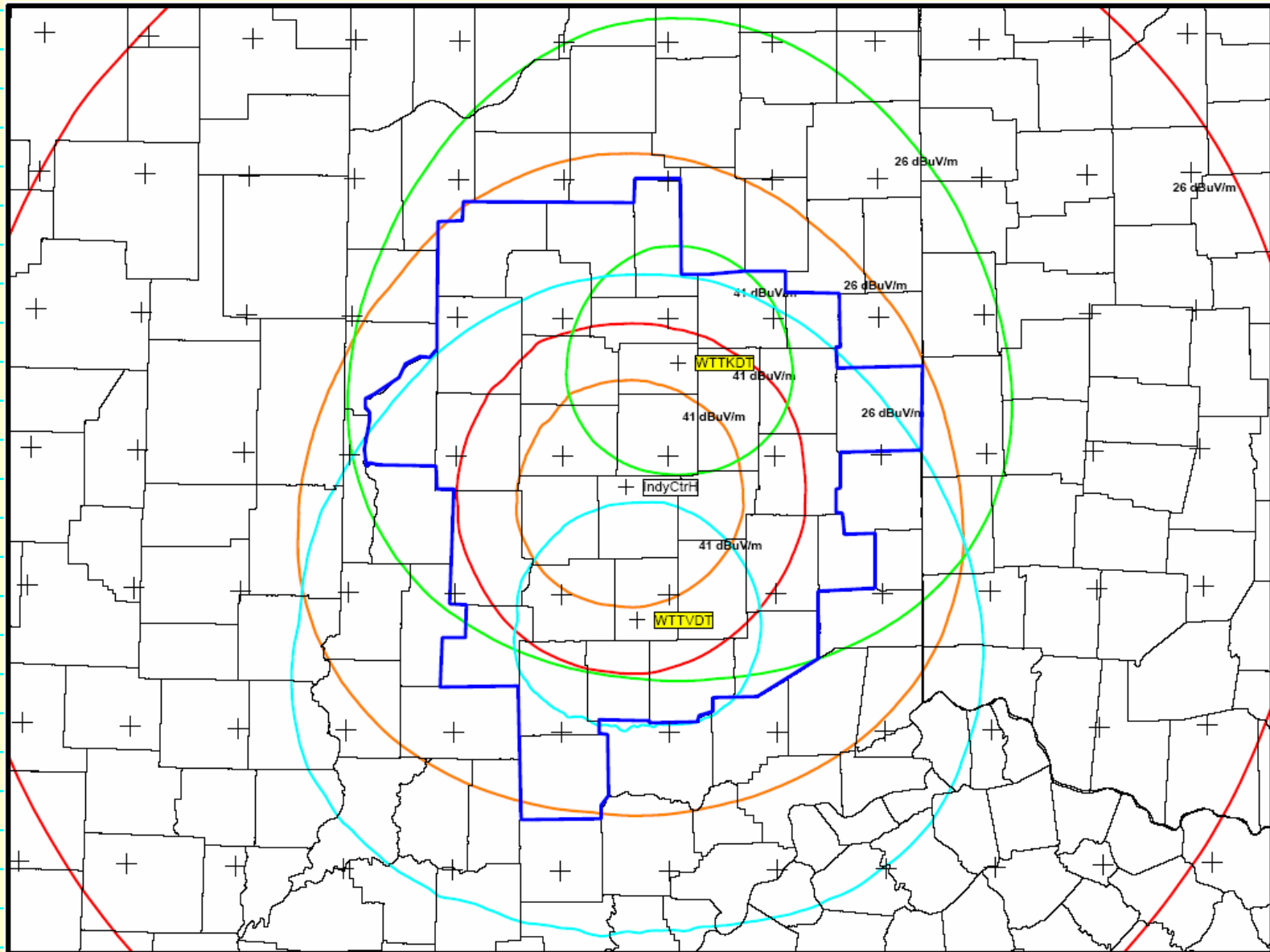
# Required / Proposed Rule Changes (2)

- ✓ Limits for Main Stations Apply to Distributed Xmtrs
  - ✓ Power
  - ✓ Antenna Height
  - ✓ *de minimis* Interference Analysis Serves as Constraint
- ✓ Eliminate Constraints of Analog Service Rules
- ✓ Interference Analysis Methods Extended
  - ✓ Modifications to Current Techniques / Software
  - ✓ Addition of 1 Field to FCC Database Records

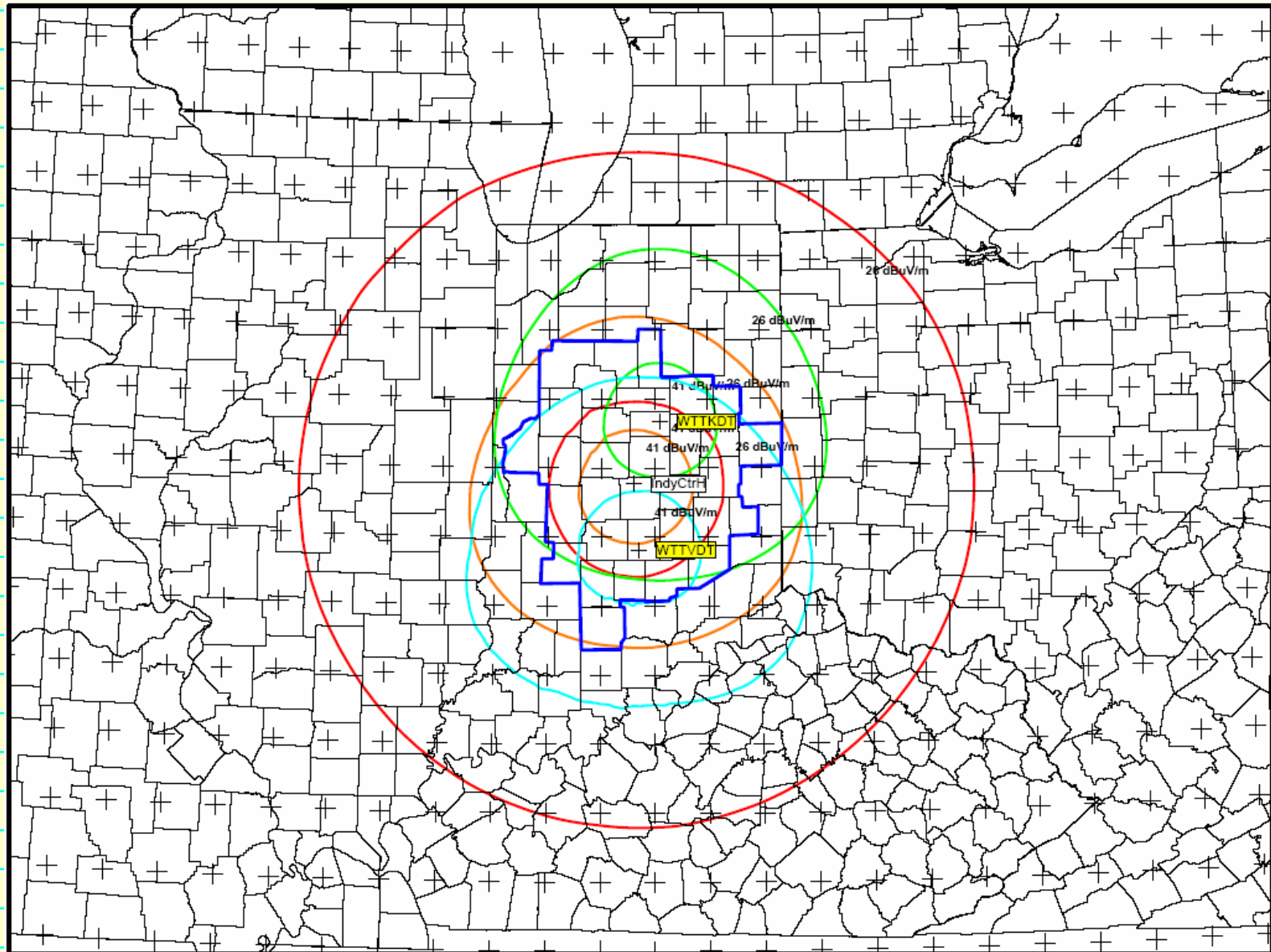
# Decisions Required in Establishing Rules

- ✓ Locations of Distributed Transmitters
  - ✓ Within Hypothetical Maximized Service Contour
  - ✓ Within Designated Market Area (DMA)
- ✓ Service Areas Permitted
  - ✓ Always Limited by *de minimis* Rules
  - ✓ Four Choices Provided in Filed Comments
    - ✓ Limitations of Service Contours
  - ✓ Avoiding Encroachment Into Neighboring DMAs

# Locations of Distributed Transmitters



# Locations of Distributed Transmitters (2)



# Recommendations for Required Decisions

- ✓ **Locations of Distributed Transmitters**
  - ✓ **Combination of Hypothetical Service Contour & DMA Boundary**
    - ✓ **Whichever extends further in any given direction**
- ✓ **Service Areas Permitted**
  - ✓ **Always Limited by *de minimis* Rules**
  - ✓ **Maintain Interference Contours Within Hypothetical IX Contour**
  - ✓ **More Than ½ of Population Served Must Be Within DMA**
    - ✓ **Evaluated for each distributed transmitter**
    - ✓ **When extending outside hypothetical maximized service contour**

# Conclusions

- ✓ **DTx Systems Provide Solutions to Significant Problems**
- ✓ **DTx Provides Significantly Increased Spectrum Efficiency**
- ✓ **DTx Systems Allow Service Extension**
  - ✓ **"Propagationally Challenged" Areas**
  - ✓ **Service Maximization**
  - ✓ **Extended Service Offerings**
- ✓ **Broadcasters Implementing DTV Facilities Now**
- ✓ **Rules Needed Now to Enable DTx Operation**
- ✓ **Request Media Bureau to Write Rules for DTx**

# **FCC Rules Necessary for 8-VSB Distributed Transmission**

**A Policy Presentation for  
Federal Communications Commission Staff  
April 8, 2004**

**S. Merrill Weiss / Merrill Weiss Group**

*Consultants in Electronic Media Technology / Management*

# DTx Standards Development

- ✓ **ATSC Candidate Standard CS/110A**
  - ✓ Defines Synchronization Methods
  - ✓ Part of ATSC Enhanced VSB Initiative
  - ✓ Integrates with E-VSB Techniques / Standards
  - ✓ WPSX-DT Facility / Equipment Built to CS/110A
- ✓ **ATSC SFN Recommended Practice Being Drafted**
  - ✓ Covers Systems Using DTx Techniques
  - ✓ Addresses Issues of Receiver Technology / Sensitivities
  - ✓ Due for Consideration at T3 Committee June Meeting

# Interference Analysis Methods

- ✓ **Based on Current Techniques**
  - ✓ Longley-Rice Propagation Model
  - ✓ OET Bulletin 69
  - ✓ *de minimis* Interference Thresholds
    - ✓ Embodied in the Rules — Whatever They May Become
- ✓ **Must Protect Neighbors from DTx Systems**
  - ✓ All Transmitters Taken Together
- ✓ **Must Protect DTx Systems from Neighbors**
  - ✓ Must Avoid Double Counting
- ✓ **Modification of Current Software**

# Software Modifications

## ✓ Interference FROM DTx System

- ✓ Main & Distributed Xmtrs Analyzed Together
- ✓ Can Be Done Manually — Turn On/Off Together
  - ✓ Method Used for Application Now On File with FCC
- ✓ Link Distr Xmtrs to Main for Automated Analysis

## ✓ Interference TO DTx System

- ✓ Treat Main & Distr Xmtrs As Single Service Area
- ✓ Generate Analysis "Cells" from Single Reference Point
- ✓ Analyze D/U Ratios Using Highest Signal Level as "D"
- ✓ If D/U Below Threshold, Count Population from Cell
  - ✓ Avoids Double-Counting Population Losses to Interference